

Geochemical and petrogenetic studies of the porphyritic Granitoids of Kyllang-Moudoh Pluton of Shillong Plateau, Meghalaya

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Shillong Plateau is the Precambrian cratonic block of the NE India. The Kyllang and Moudoh Plutons of the Shillong plateau intrude into basement gneiss. The basement gneiss and porphyritic granite rocks have a similar petrographic characters in a broad sense.

The major geochemical characters show igneous trends for most of the elemental plots except for Na₂O and K₂O which could be indicate slightly perturbed rocks due to post crystallization processes. These rocks were derived from the melt of sub-alkaline, per-aluminous and high-potassium calc-alkaline series. Trace elements also showing the negative trends (prominently in the Sc and V vs. Si) indicate that the fractionation of amphiboles and titano-magnetites. Rare Earth Elements (REE) and Multi-element patterns show Eu negative anomaly. Multi-element patterns show enriched with the Nb, P and Ti negative anomalies. These geochemical characters indicate that the slab derivation features or the crustal contamination of the melt.

U-Pb SHRIMP zircon dating of the basement gneiss are recorded four main ages 1400-1900 Ma, 1050-1350 Ma, 758± 40 Ma and 507± 40 Ma. They are majorly clustered in the phase (510.6± 7.6 Ma). This phase might be of a crystallization age which appears at moderate degree of partial melting at shallow depths during the amalgamation of the Gondwana supercontinent. The ages of granite from Kyllang pluton are 1157± 24 Ma and 800-1000 Ma which is similar to basement gneiss. The plateau was probably formed at the time of the collision of two proto-Indian, continental blocks at around 1600 Ma and also at the time of the collision between India-Antarctica and Australia-South Africa during the formation of Rodinia at around 1100 Ma.